A1250-1

NOVEMBER 19, 1984
CHEMICAL & ENGINEERING

NEWS

Organic Electrochemistry

Chemical, engineering, and materials advances spur new uses Page 43

05111790095 9 M AR6247SL 1
CONGRESSIONAL INFO SERV-SRI
4520 EAST WEST HWY SUITE 800
SRI ACQUISITIONS
BETHESDA MD 20814

CHEMICAL & ENGINEERING NEWS

Volume 62, Number 47
CENEAR 62 (47) 1–84
ISSN 0009-2347

NOVEMBER 19, 1984

News of the Week

■ **Presidential commission recommends establishing Cabinet-level Department of Science & Technology.** **Page 6**

■ **George C. Pimentel will be ACS president-elect in 1985.** **Page 7**

■ **OTA turns thumbs down on building a permanent manned space station until space program goals are set.** **Page 7**

■ **COSEPUP panel recommends federal funding for biochemical engineering.** **Page 8**

■ **Biological properties of chemical compounds from scientists in developing countries will be tested under UN program.** **Page 8**

Cover: Bank of electrolysis cells, with associated recirculation surge drums, is heart of process Nalco Chemical uses for electrosynthesis of lead alkyl antiknock compounds at Freeport, Tex.

Letters 4
Editor's Page 5

Concentrates
Business 10
Government 20
Science/Technology 30

The Departments
New Products 61
ACS News 64
People 65
Meetings 68
Newscripts 84

Business

U.S. chemical trade surplus expected to drop 6% below 1983 level, lowest since 1978; U.S. drug firm third-quarter earnings trailed earlier results, partly because of strong U.S. dollar. **Page 12**

International Business

Anticipated round of multilateral trade negotiations will cover services, investment, high tech, possible tariff cuts. **Page 17**

Government

Senate committee realignment after selection of a new majority leader may put more liberal Republicans in positions of power; House report blasts EPA's pesticide enforcement record. **Page 21**

Science

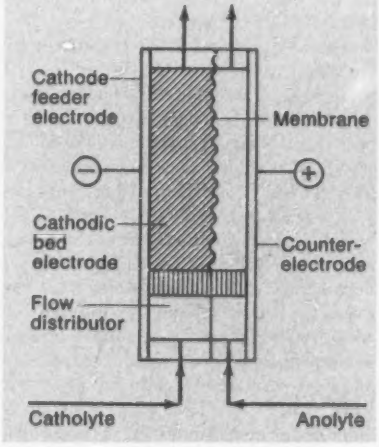
Japan's Suntory Institute for Bioorganic Research is unique in independence from its owner, innovative practices; current work involves structures of natural shark repellents. **Page 33**

Technology

BP Chemicals International is licensing polyethylene process it claims is low in investment, energy, and labor costs. **Page 40**

Books

"The Technical Manager's Survival Book" by Melvin Silverman has some helpful guidelines, but little new material. **Page 62**



Special Report

Organic electrochemistry is undergoing a renaissance catalyzed by new developments in chemistry, engineering, and materials science. **Page 43**

Chemical Trade Surplus Continues To Shrink

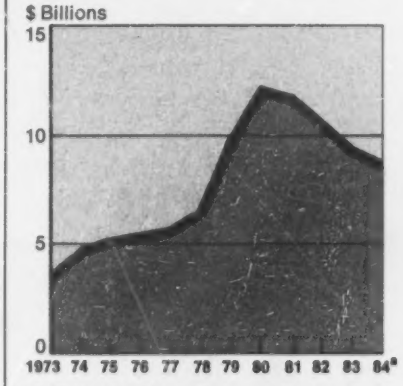
Surplus is forecast to drop this year to almost $8.5 billion, about 6% below 1983 level and the lowest since 1978

The U.S. international trade deficit in 1984 is easily heading to records that will approach and probably exceed $100 billion. The relative strength of the dollar, plus the rapidly expanding U.S. economy over the past two years, has provided foreign producers with cheap markets for their products. At the same time, the dollar's strength has made U.S.-produced goods high priced on the foreign markets, while slower growth in foreign economies and some protectionist policies overseas have denied international markets to U.S. producers of goods.

The U.S. chemical industry, one of the few U.S. industries with a positive trade balance, is not immune from these pressures. Although exports have increased for the industry, imports of chemicals into this country have soared even faster, pushing the chemical trade surplus downward.

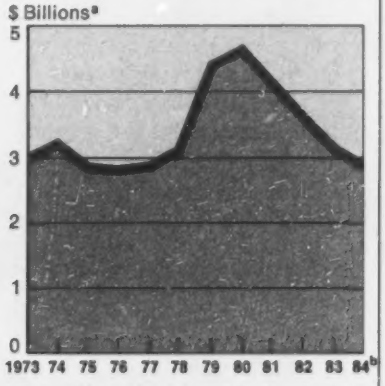
Through the first nine months of this year, chemical exports have risen 14% to $16.7 billion. However, at the same time, imports on a customs basis have jumped 31% to $10.3 billion. [Customs basis is the price actually paid or payable for merchandise when sold for exportation to the U.S.; it excludes such costs as import duties, insurance, and transportation and is essentially the value of the product at the producer's site. Thus it is nearer to being comparable to the export value of product than is the alternative c.i.f. (cost, insurance, freight) value.] The rapid increase of imports into the U.S. has driven the trade surplus downward to the point that, over the first nine months, the balance of trade for the chemical industry has dropped 5% from the comparable period in 1983 to $6.4 billion.

Chemical trade surplus has fallen for past four years . . .



a C&EN estimate. **Source:** Bureau of the Census

. . . and in constant dollars is lower than a decade ago



a Deflated by producer price index for chemicals and allied products (1967 = 100). b C&EN estimate. **Source:** Bureau of the Census

For the year, C&EN estimates that the trade surplus for chemicals will be almost $8.5 billion—about 6% below 1983 levels. In spite of the fact that exports will be setting records, this will be the lowest the chemical surplus has been since 1978.

The situation can be regarded as even more dire, however. If the trade surplus is deflated to constant dollars using the producer price index for chemicals, it is projected to amount to about $2.8 billion (in 1967 dollars) this year, down almost 9% from 1983 and the lowest it has been since the 1960s.

There is a great disparity within the chemical industry itself in terms of the trade balance. According to government figures, for the first five months of 1984, the relative movement of the surplus in chemicals varied widely from product category to product category, depending in no small part on the nature of the chemicals themselves and on government regulation of the products. For instance, the more specialty products and those that must receive government approval for marketing showed less movement in general than did the large commodity-oriented product categories.

Thus, in inorganic chemicals, which have been hard pressed for some time, exports at $1.09 billion for the first five months remained about the same as the same period last year, whereas imports were rising 20% to $1.33 billion. This raised the deficit in these chemicals to $237 million, more than 150 times what it had been in the first five months of 1983.

Another big percentage drop was in essential oils and perfume materials, where the surplus fell 47% to $78.1 million in the first five months of the year. Exports for this small-

Imports of chemicals are soaring

$ Millions	EXPORTS		IMPORTS		TRADE BALANCE	
	First five months 1984	% change from 1983	First five months 1984	% change from 1983	First five months 1984	% change from 1983
Chemicals and related products	$9821.1	13%	$6721.2	25%	$3199.9	−4%
Organic chemicals	2632.8	26	1833.0	23	799.8	19
Inorganic chemicals	1024.6	0	1331.3	20	−236.7	1447
Dyeing, tanning & coloring materials[a]	208.3	5	234.4	36	−26.1	nm
Medicinal & pharmaceutical products	1080.8	4	364.3	34	716.5	−6
Essential oils & perfume materials[b]	339.4	5	261.3	48	78.1	−47
Fertilizer & fertilizer materials	696.6	34	572.0	18	124.6	263
Explosives & pyrotechnic devices	80.5	145	38.8	14	41.7	nm
Synthetic resins & rubber or plastic materials[c]	1627.2	8	615.7	58	1011.5	−9
Other	1160.8	6	470.5	−4	690.3	15

a Natural and synthetic. b Toilet, polishing, and cleaning preparations. c Includes waste and scrap. nm = not meaningful. Source: Bureau of the Census.

volume category increased 5% to $339 million, but imports rose 48% to $261 million.

Synthetic resins, the second largest volume category, showed a 9% drop in trade surplus to $1.01 billion on an 8% rise in exports to $1.63 billion, but an import increase of 56% to $616 million. Low- and medium-density polyethylene provides an example of what was happening in the synthetic resins area. Low-density polyethylene maintained a healthy positive trade surplus of $229 million, while exports fell 28% to $255 million and imports increased more than fivefold to $25.5 million. Physical volume of the resin through the five-month period increased from 15.6 million lb in 1983 to 76.9 million lb this year, equal to almost 2% of U.S. low-density polyethylene capacity.

Only one of the chemical categories—explosives—recovered from a deficit in 1983 to a surplus this year. Explosive and pyrotechnic devices had a 145% increase in exports to $80.5 million with only a 14% rise in imports to $38.8 million. This gave a $41.7 million surplus in the first five months of this year, compared with a $1.3 million deficit in the same period in 1983.

Most industry analysts predict that the trade surplus for chemicals will keep dwindling as chemical industries are built up in other parts of the world. But for the short term, they say that bringing down the federal deficit and lowering the value of the dollar will go a long way to help the current situation. However, not all agree that this is the total answer.

At a recent Chemical Manufacturers Association meeting in Houston, Alfred E. Eckes Jr., chairman of the U.S. International Trade Commission, said, "We should not blithely assume that import competition will go away when the dollar begins to sag. Having penetrated the U.S. market and developed marketing networks and product recognition when the dollar was strong, foreign suppliers will struggle—and accept smaller profits, if necessary—to preserve their market position when the currency advantage diminishes."

Many chemical industry sources do not agree with this assessment, however. One told C&EN that what Eckes says may be true for some smaller, value-added products where foreign producers have found a niche, but for the larger commodity chemicals price is the determining factor and when the price of U.S. goods falls relative to foreign product, customers will quickly switch to take advantage.

William Storck, New York

Follow the Pittsburgh Conference EARLY BIRD...

Book your airline reservations, at Special Conference Rates!

CALL:

CONFERENCE AIR SERVICES

1-800-336-0227

In Virginia & Washington, D.C.

703-528-0114

New Orleans

FEBRUARY 25 - MARCH 1, 1985

CIRCLE 40 ON READER SERVICE CARD

Drug company earnings slowed in third quarter

As in the second quarter, one of the most prominent influences affecting pharmaceutical company earnings in the third quarter was the strength of the dollar against overseas currencies. The robust performance of the dollar meant that sales gains in local currency overseas often translated into far smaller gains in dollars. At the same time, companies were faring with differing degrees of success in the newly competitive hospital supply market, leading in some cases to declines in operating earnings in related segments.

These constraints on earnings resulted in a composite gain in net income for a group of 17 major pharmaceutical firms of just 6% on a sales increase of a mere 4% in the third quarter. In the three preceding business periods, by contrast, the industry's net income had registered double-digit percentage increases over the comparative year-earlier quarter. The composite profit margin (after-tax income as a percentage of sales) for the group edged up to 11.1% from 10.9% the year before.

As might be expected, discussion of the impact of currency translation on the bottom line loomed large in many companies' earnings statement commentaries, and chief executive officers took pains to point out how much better the firm would have done had the dollar's value only stayed where it was 12 months earlier. Exchange rates are vitally important to the pharmaceutical industry, because many companies do as much as a third to a half of their business overseas.

At Avon Products, for instance, the total foreign exchange effect on net earnings was a loss of $5.2 million in the third quarter and $18.5 million over the first nine months of 1984. Baxter Travenol, which recorded a 31% decline in net income for the quarter, says that its international sales growth, amounting to 5%, would have totaled 13% had currency values remained constant. At Bristol-Myers, exchange rates cut total company sales growth $34 million, or 3%, for the quarter, and $108 million, or 4%, for the nine-month period.

Besieged A. H. Robins, record sales of which were canceled out by litigation costs involving its Dalkon Shield contraceptive device, also felt the exchange rate sting: Net earnings were reduced $500,000 for the quarter and $1.8 million for the first nine months. At SmithKline Beckman, currency translation effects chopped $17 million and $54 million, for the quarter and nine-month periods respectively, off total sales. Upjohn's net earnings for the quarter were reduced $2.4 million by exchange rates.

Hospital cost-containment efforts, spurred by the government's new medicare reimbursement schedule, continue to combine with lower hospital admission rates, resulting in a far more competitive climate for hospital suppliers than was the case even a year ago. At Avon Products' Mallinckrodt division, for example, operating profit declined in the third quarter primarily because of soft demand and weaker prices in several key health-care lines on account of cost-containment programs, the company says. Warner-Lambert chairman Ward S. Hagan says that its health technologies businesses continue to be affected by weakness in the hospital supply market.

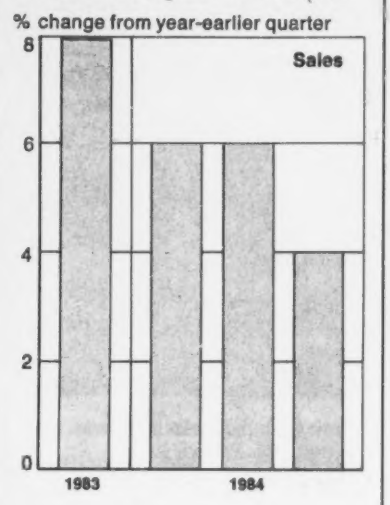
Baxter Travenol points out that the company's results continue to be affected negatively by declining hospital admissions in the U.S. "As a result of these factors and the continuing decline of foreign currency values compared to a year ago, the

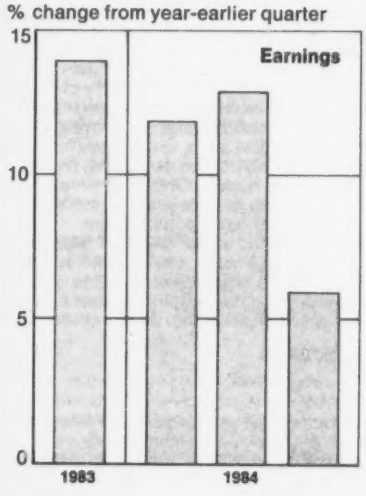
Pharmaceutical firms' earnings rose just 6%, sales 4%

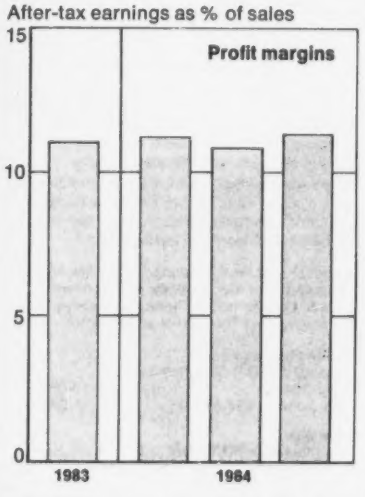
	THIRD-QUARTER 1984						NINE-MONTHS 1984					
	Sales	Earnings[a]	Change from 1983		Profit margin[b]		Sales	Earnings[a]	Change from 1983		Profit margin[b]	
	($ millions)		Sales	Earnings	1984	1983	($ millions)		Sales	Earnings	1984	1983
Abbott Laboratories	$ 731.2	$ 91.4	1%	14%	12.5%	11.1%	$2253.6	$279.5	6%	16%	12.4%	11.4%
American Home Products	1191.7	172.5	7	10	14.5	14.0	3450.3	489.7	5	10	14.2	13.5
Avon Products	747.3	30.3	5	13	4.1	3.8	2289.2	108.0	6	5	4.7	4.7
Baxter Travenol	465.9	39.7	−1	−31	8.5	12.2	1340.0	122.6	−2	−23	9.1	11.7
Bristol-Myers	1062.6	133.6	3	14	12.6	11.3	3178.6	354.7	7	17	11.2	10.3
Lilly	712.6	111.7	1	8	15.7	14.7	2331.3	372.4	2	9	16.0	15.0
Merck	857.9	120.9	8	11	14.1	13.7	2597.7	377.4	9	9	14.5	14.5
Pfizer	982.7	132.8	4	21	13.5	11.6	2888.2	378.6	4	15	13.1	11.8
Revlon	617.1	23.4	3	14	3.8	3.4	1759.9	78.8	1	6	4.5	4.3
A. H. Robins	157.3	0.2	9	−99	0.1	10.2	465.7	20.2	11	−54	4.3	10.5
Schering-Plough	464.1	38.3	6	5	8.3	8.4	1426.2	139.5	4	−9	9.8	11.2
G. D. Searle	307.8	44.6	22	12	14.5	15.8	911.5	108.3	38	44	11.9	11.4
SmithKline Beckman	750.8	129.0	1	1	17.2	17.1	2183.0	379.7	3	3	17.4	17.4
Squibb	492.8	63.4	7	12	12.9	12.3	1362.3	147.4	5	13	10.8	10.1
Sterling Drug	484.9	45.3	−5	1	9.3	8.7	1388.1	106.1	−2	5	7.6	7.1
Upjohn	510.7	26.8	7	−28	5.2	7.8	1655.5	139.4	12	10	8.4	8.5
Warner-Lambert	798.5	56.6	3	12	7.1	6.5	2373.1	172.7	2	14	7.3	6.5

a Excludes significant extraordinary and nonrecurring items. b After-tax income as a percentage of sales.

Pharmaceutical industry 1984 third-quarter results







Note: All sales, earnings, and profit margin data are based on combined results of the 17 companies listed on page 14.

Early cuneiform tablet.

3500 B.C.

To cope with a need to record information, man learns to write.

Today,

the problem isn't how to record information, it's how to find it.

Thousands of years ago, an information problem was solved when writing was invented in Mesopotamia.

Today, you face an information problem of a different kind. How do you find the information you need in a world overwhelmed with data?

The solution is DIALOG,® the world's largest scientific and technical databank. For over a decade we've been providing online access to chemical information.

To millions of journal articles, conference papers, technical reports, and patents indexed by Chemical Abstracts Service since 1967.

Plus, over 100 additional databases covering medicine, pharmacology, energy, industry, engineering, materials, patents and trademarks. The information you need to do your job.

All available instantly, from your desktop terminal or personal computer. With no monthly minimums or initiation fees.

To learn more about this revolutionary tool for chemists, contact DIALOG Marketing, 3460 Hillview Ave., Dept. 36, Palo Alto, CA 94304. Call 800/227-1927 (800/982-5838 in Calif.).

DIALOG

INFORMATION SERVICES, INC.

A subsidiary of the Lockheed Corporation.

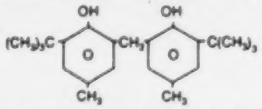
© DIALOG Information Services, Inc. 1984

CIRCLE 32 ON READER SERVICE CARD

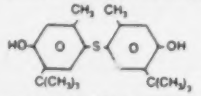
THE CHOICE IS EASY

Borg-Warner Chemicals, the only single source for *all* these high-quality additives:

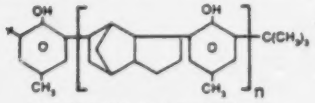
ULTRANOX™ 246 Antioxidant
2,2'-methylene-bis-(4-methyl-6-t-butylphenol)



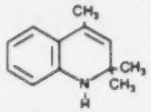
ULTRANOX 236 Antioxidant
4,4'-thio-bis(2-t-butyl-5-methylphenol)



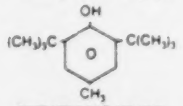
ULTRANOX 256 Antioxidant
Polymeric sterically hindered phenol



ULTRANOX 254 Antioxidant
Polymeric 2,2,4-trimethyl-1, 2-dihydroquinoline



ULTRANOX 226 Antioxidant
2,6 di-t-butyl-4-methylphenol



WESTON® TNPP
TrisNonylphenyl Phosphite

EBS WAX
N,N'-ethylenebisstearamide

Call us also for SPINUVEX™ Hindered Amine Light Stabilizers, WESTON® Stabilizers, BLENDEX® ABS Modifiers, Surfactants, Emulsifiers, Phosphate Plasticizers, Polymer Lubricants and Alkylphenols.

™ SPINUVEX is a trademark of Montefluos
™ ULTRANOX is a trademark of Borg-Warner Chemicals, Inc.
® BLENDEX and WESTON are registered trademarks of Borg-Warner Chemicals, Inc.

(304) 424-5411

Borg-Warner Chemicals, Inc.

BORG WARNER

CIRCLE 9 ON READER SERVICE CARD

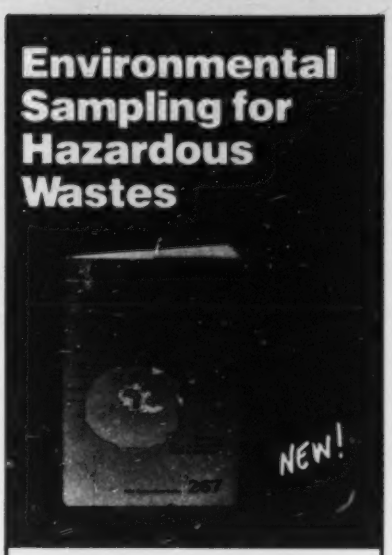
company does not expect 1984's full-year earnings to exceed those of the previous year," the company says. Over the first nine months of 1984, Baxter Travenol's net income was down 23% from the same period in 1983.

Still, product mix played a major role in how companies performed in the hospital supply market. Abbott Laboratories, for example, with a 14% earnings gain in the third quarter, says that although the company's hospital-related business is being affected by cost containment measures, much of the firm's business does not depend directly on hospital admissions and surgical procedures. Chief executive officer Robert A. Schoellhorn also points out that Abbott's research and development expenditures are up 21% over the first nine months of the year, partly to fund the company's efforts to develop cost-effective health care products.

Pharmaceutical companies also continue to attempt to counter the impact of hospital cost-control programs with cost-control efforts of their own. Merck chairman and chief executive officer John J. Horan, for instance, says that, although the dollar's strength and a higher effective tax rate had an adverse effect on the company's earnings, "cost-control measures helped to offset these factors." At Eli Lilly, chairman Richard D. Wood notes that third-quarter results benefited from control of manufacturing costs and operating expenses. He points out that although R&D spending rose substantially in the quarter, other operating expenses were down slightly from the same period last year.

G. D. Searle continued to depend heavily on its aspartame products: Third-quarter sales of $134 million accounted for 44% of the company's total sales in the period. Searle's continued independence is now a question, however. In September, members of the Searle family, which owns a large number of the company's stock, asked management to consider ways for the family holdings to be diversified. One of the likelier methods of such diversification would be the sale of the firm.

David Webber, New York



Glenn E. Schweitzer and John A. Santolucito, *Editors*
U.S. Environmental Protection Agency

Underlines the concern and need for improved methods of environmental sampling. Surveys the problems of collecting representative samples, ensuring the chemical integrity of samples from collection to analyses, and characterizing and monitoring contamination sites. Examines the important aspects of designing and implementing sampling programs, emphasizing surface and subsurface sampling for hazardous wastes. Looks into the experiences of federal and state agencies, and academic and institutional organizations. Cites several successful field programs for sampling dioxin, lead, and cyanide.

CONTENTS

Hazardous Waste: Questions and Issues from the Field • Uses of Environmental Testing in Human Health Risk Assessment • Assessing Cyanide Contamination from an Aluminum Smelter • 2,3,7,8-Tetrachlorodibenzo-*p*-dioxin Sampling Methods • Field Measurement of Polychlorinated Biphenyls in Soil and Sediment Using a Portable Gas Chromatograph • Using Geostatistics in Assessing Lead Contamination near Smelters • Lead Levels in Blood of Children Around Smelter Sites in Dallas • An Approach to Interdisciplinary Design of Multifactor Experiments • Statistical Methods in Environmental Sampling • Soil Sampling Quality Assurance and the Importance of an Exploratory Study • Quality Assurance for Measurement Program • New Ways of Assessing Spatial Distributions of Pollutants • Detecting Elevated Contamination by Comparison with Background

Based on a workshop sponsored by the ACS Committee on Environmental Improvement, the U.S. Environmental Protection Agency, and the University of Nevada—Las Vegas

ACS Symposium Series No. 267
144 pages (1984) Clothbound
LC 84-20480 ISBN 0-8412-0884-0
US & Canada **$34.95** Export **$41.95**

Order from:
American Chemical Society
Distribution Office Dept. 18
1155 Sixteenth St., N.W.
Washington, DC 20036
or CALL TOLL FREE 800-424-6747
and use your VISA, MasterCard,
or American Express credit card.